REMARKS

The Final Office Action of July 20, 2004, has been received and reviewed.

Claims 1-28 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1 and 20 stand rejected under 35 U.S.C. § 112, second paragraph, for reciting subject matter which the Office alleges to be indefinite.

Specifically, the Office has rejected claims 1 and 20 for reciting "causing a chemical reaction" and "depositing an interconnect material . . . in situ with causing the chemical reaction." It has been asserted that both of these acts would be part of the same chemical reaction.

It is respectfully submitted that the subject matter recited in independent claims 1 and 20 is definite to one of ordinary skill in the art. This is because independent claim 1 and independent claim 20 both recite that the act of "causing a chemical reaction" is effected "in situ with" the act of "depositing an interconnect material." As is well known, the phrase "in situ" means "[i]n the original position." American Heritage College Dictionary, Third Ed. (1997). As used in independent claims 1 and 20, this means that the acts of "causing a chemical reaction" and "depositing an interconnect material" are separate acts that are conducted on a substrate as it remains in the same position, or reaction chamber.

Thus, the language of independent claims 1 and 20 would readily assist one of ordinary skill in the art in understanding that the acts of "causing a chemical reaction" and "depositing an interconnect material" are separate acts that occur in situ with one another. As such, it is respectfully submitted that independent claims 1 and 20 meet the definiteness requirement of the second paragraph of 35 U.S.C. § 112.

Accordingly, withdrawal of the 35 U.S.C. § 112, second paragraph, rejections of independent claims 1 and 20 is respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 1-28 stand rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Shinriki in View of Chen

Claims 1, 8-10, 12-20, 23, and 25-28 are rejected under 35 U.S.C. § 103(a) for reciting subject matter which is purportedly unpatentable over the subject matter taught in U.S. Patent 6,001,729 to Shinriki et al. (hereinafter "Shinriki"), in view of teachings from U.S. Patent 6,020,259 to Chen et al. (hereinafter "Chen").

Shinriki teaches processes for forming interconnects for aluminum and aluminum-copper conductive lines in semiconductor devices. Broadly, the methods that are taught in Shinriki include forming a metal nitride film adjacent to a metal silicide film. In each of the process embodiments that Shinriki teaches, the metal silicide film and metal nitride film are formed in separate process chambers (*see, e.g.,* col. 7, lines 47-67; col. 11, lines 49-60; col. 12, lines 36-43; col. 13, line 50, to col. 14, line 6; col. 15, lines 34-57; col. 16, lines 6-22 and 49-52; col. 17, lines 7-15; col. 17, lines 16-23; col. 18, lines 10-47; col. 19, lines 59-64; col. 20, line 51, to col. 21, line 20; col. 21, lines 35-46), often with additional, intervening process steps (*see, e.g.,* col. 11, lines 49-60; col. 13, line 50, to col. 14, line 6; col. 15, lines 34-57; col. 16, lines 6-22 and 49-52; col. 18, lines 10-47; col. 19, lines 59-64; col. 20, line 51, to col. 21, line 20). Shinriki also lacks any teaching or suggestion that a metal nitride film may be deposited over a metal silicide film.

The teachings of Chen are drawn to processes that include depositing both a metal silicide film and a metal nitride film. While Chen teaches that both films may be formed by chemical vapor deposition processes, Chen does not teach or suggest that that the two films may be deposited in situ with one another.

It is respectfully submitted that there are at least two reasons that a *prima facie* case of obviousness has not been established against any of claims 1, 8-10, 12-20, 23, or 25-28.

First, it is respectfully submitted that Shinriki and Chen, taken either together or separately, do not teach or suggest each and every element of any of claims 1, 8-10, 12-20, 23, or 25-28.

With respect to the subject matter recited in independent claim 1, it is respectfully submitted that neither Shinriki nor Chen teaches or suggests a method for fabricating an interconnect that includes "causing a chemical reaction . . . to selectively deposit metal silicide . . . and depositing an interconnect material onto the metal silicide *in situ with* causing the chemical reaction." (Emphasis supplied).

As has been noted at page 4 of the Final Office Action, Shinriki lacks any teaching or suggestion of *depositing* an interconnect material. Additionally, as Shinriki quite clearly explains, and as those of ordinary skill in the art are aware, nitridation (*i.e..,* the formation of a metal nitride) occurs in a separate chamber (*e.g.,* according to Shinriki, a rapid thermal processing (RTP) chamber) from deposition of the metal silicide film (which Shinriki teaches occurs in a chemical vapor deposition chamber or sputtering chamber). Thus, Shinriki does not teach or suggest that either of these processes are conducted *in situ* with one another.

While Chen teaches that that chemical vapor deposition processes may be used to form both a metal silicide layer and a metal nitride layer, Chen lacks any teaching or suggestion that these processes may be effected in the same chamber as one another or otherwise in situ with each other.

Therefore, Shinriki and Chen do not teach or suggest each and every element of independent claim 1, as would be required to maintain the 35 U.S.C. § 103(a) rejection thereof.

Claims 8-10, and 12-19 are each allowable, among other reasons, for depending either directly or indirectly from claim 1, which is allowable.

Independent claim 20 is drawn to a method for fabricating a selective contact and a local interconnect on a semiconductor device structure. The method of independent claim 20 includes, among other things, "causing a chemical reaction . . . to selectively deposit a contact material . . . and depositing an interconnect material onto the contact material *in situ with* causing the chemical reaction." (Emphasis supplied).

Again, Shinriki and Chen do not teach or suggest that a metal silicide and a metal nitride, or any other contact material and interconnect materials, may be formed *in situ* with one another. Rather, the teachings of Shinriki are clearly limited to processes that are effected at different sites, while the teachings of Chen are silent as to where the two disclosed chemical reactions occur.

Therefore, Shinriki and Chen do not teach or suggest each and every element of independent claim 20. It is, therefore, respectfully submitted that, under 35 U.S.C. § 103(a), independent claim 20 is drawn to subject matter which is allowable over that taught in both Shinriki and Chen.

Each of claims 23 and 25-28 is allowable, among other reasons, for depending either directly or indirectly from claim 20, which is allowable.

Second, it is respectfully submitted that one of ordinary skill in the art would have no reason to expect that the asserted combination of teachings from Shinriki and Chen would successfully result in the processes that are recited in any of claims 1, 8-10, 12-20, 23, or 25-28.

In particular, it is submitted that, because Shinriki and Chen both fail to teach or suggest that deposition of an interconnect may be conducted in situ with a chemical reaction that selectively deposits a contact material, one of ordinary skill in the art would have no reason to expect that any combination of teachings of Shinriki and Chen would successfully result in such a method, as required by independent claims 1 and 20.

As such, the subject matter recited in independent claims 1 and 20, as well as that of claims 8-10, 12-29 and 23 and 25-28, respectively depending therefrom, is, under 35 U.S.C. § 103(a), allowable over the teachings of Shinriki and Chen.

For these reasons, it is respectfully submitted that a *prima facie* case of obviousness has not been established against any of claims 1, 8-10, 12-20, 23, or 25-28 and that these claims are, therefore, allowable under 35 U.S.C. § 103(a).

Shinriki, Chen, and Chang

Claims 2-5, 21, and 22 have been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter which is assertedly unpatentable over the teachings of Shinriki, in view of teachings from Chen and, further, in view of the subject matter taught in U.S. Patent 5,043,299 to Chang et al. (hereinafter "Chang").

Claims 2-5 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claims 21 and 22 are allowable, among other reasons, for respectively depending directly and indirectly from claim 20, which is allowable.

Shinriki, Chen, and Kolar

Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is purportedly unpatentable over teachings from Shinriki, in view of the teachings of Chen and, further, in view of the subject matter taught in U.S. Patent 5,162,259 to Kolar et al. (hereinafter "Kolar").

Claims 6 and 7 are both allowable, among other reasons, for respectively depending directly and indirectly from claim 1, which is allowable.

Claims 6 and 7 are further allowable because the teachings of Kolar are limited to cleaning processes in which a substrate is removed from a deposition chamber, in which a metal nitride layer was formed, and placed into a wet chemical bath. Col. 5, lines 7-23. Thus, if the teachings of Kolar were incorporated into the asserted combination of teachings from Shinriki and Chen, the substrate would have to be removed from the deposition chamber prior to cleaning, then subsequently moved to a deposition chamber for metal nitride deposition. As

such, the acts of "causing a chemical reaction" and "depositing an interconnect material" could not be conducted *in situ,* as required by independent claim 1.

Thus, it is clear that, in addition to teach or suggest each and every element of independent claim 1, from which claims 6 and 7 depend, Kolar teaches away from the "in situ" requirement of independent claim 1.

As such, the teachings of Kolar cannot be combined with those of Shinriki and Chen to establish a *prima facie* case of obviousness against any of the claims of the above-referenced application, including claims 6 and 7.

Shinriki, Chen, and Kim

Claims 11 and 24 are rejected under 35 U.S.C. § 103(a) for reciting subject matter which is allegedly unpatentable over the subject matter taught in Shinriki, in view of teachings from Chen and, further, in view of the teachings of U.S. Patent 5,821,164 to Kim et al. (hereinafter "Kim").

Claim 11 is allowable, among other reasons, for depending directly from claim 1, which is allowable.

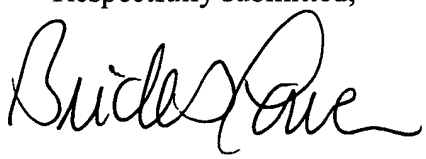
Claim 24 is allowable, among other reasons, for depending directly from claim 20, which is allowable.

In view of the foregoing, it is respectfully requested that the 35 U.S.C. § 103(a) rejections of claims 1-28 be withdrawn.

CONCLUSION

It is respectfully submitted that each of claims 1-28 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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